(No Model.) 4 Sheets—Sheet 1.

C. Z. F. ROTT.

MACHINE FOR PRINTING GLASSWARE.

No. 491,025. Patented Jan. 31, 1893.

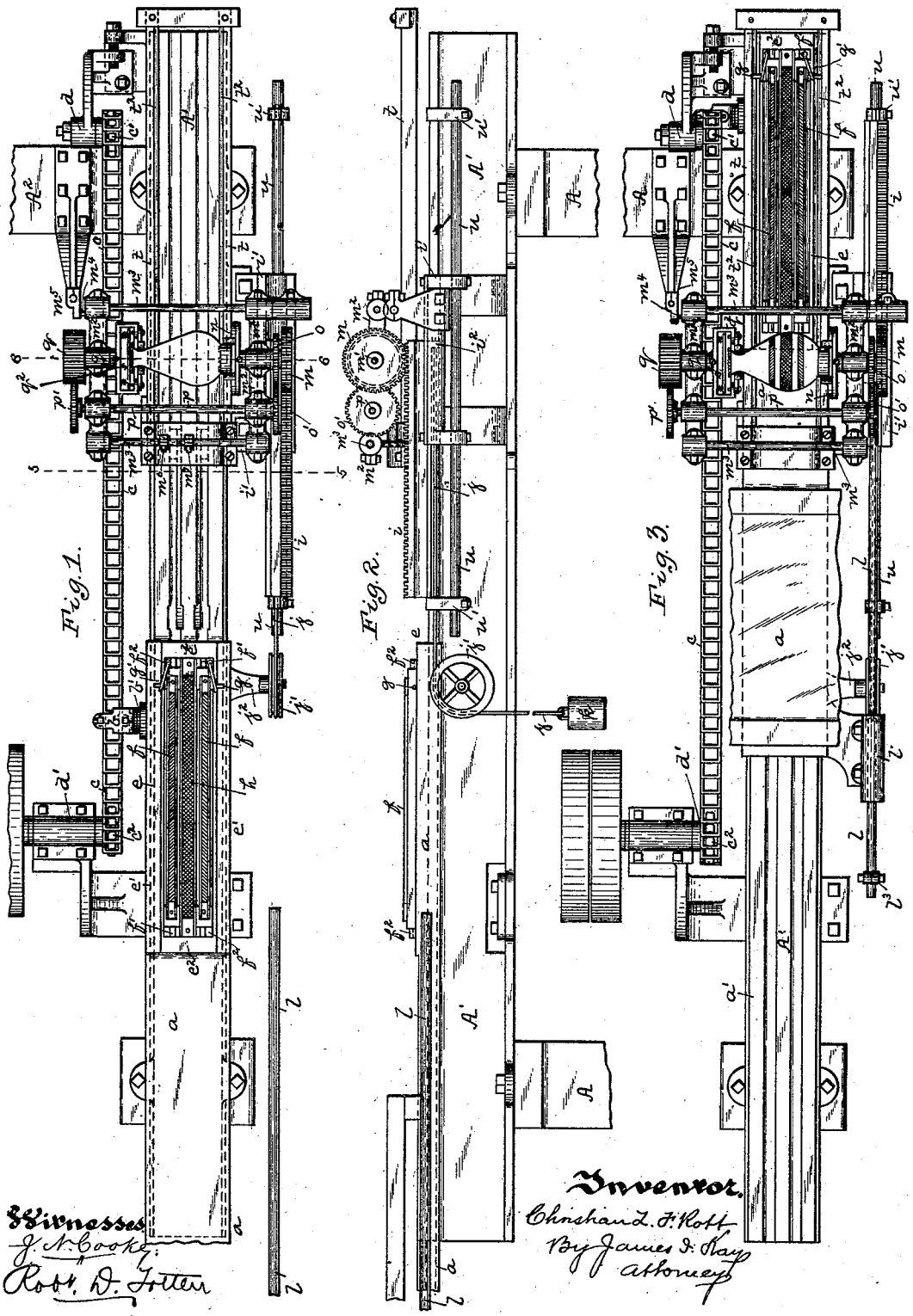

Fig. 1.

Fig. 2.

Fig. 3.

Witnesses
J. N. Cooke.
Robt. D. Potter

Inventor.
Christian Z. F. Rott
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(No Model.) 4 Sheets—Sheet 2.

C. Z. F. ROTT.

MACHINE FOR PRINTING GLASSWARE.

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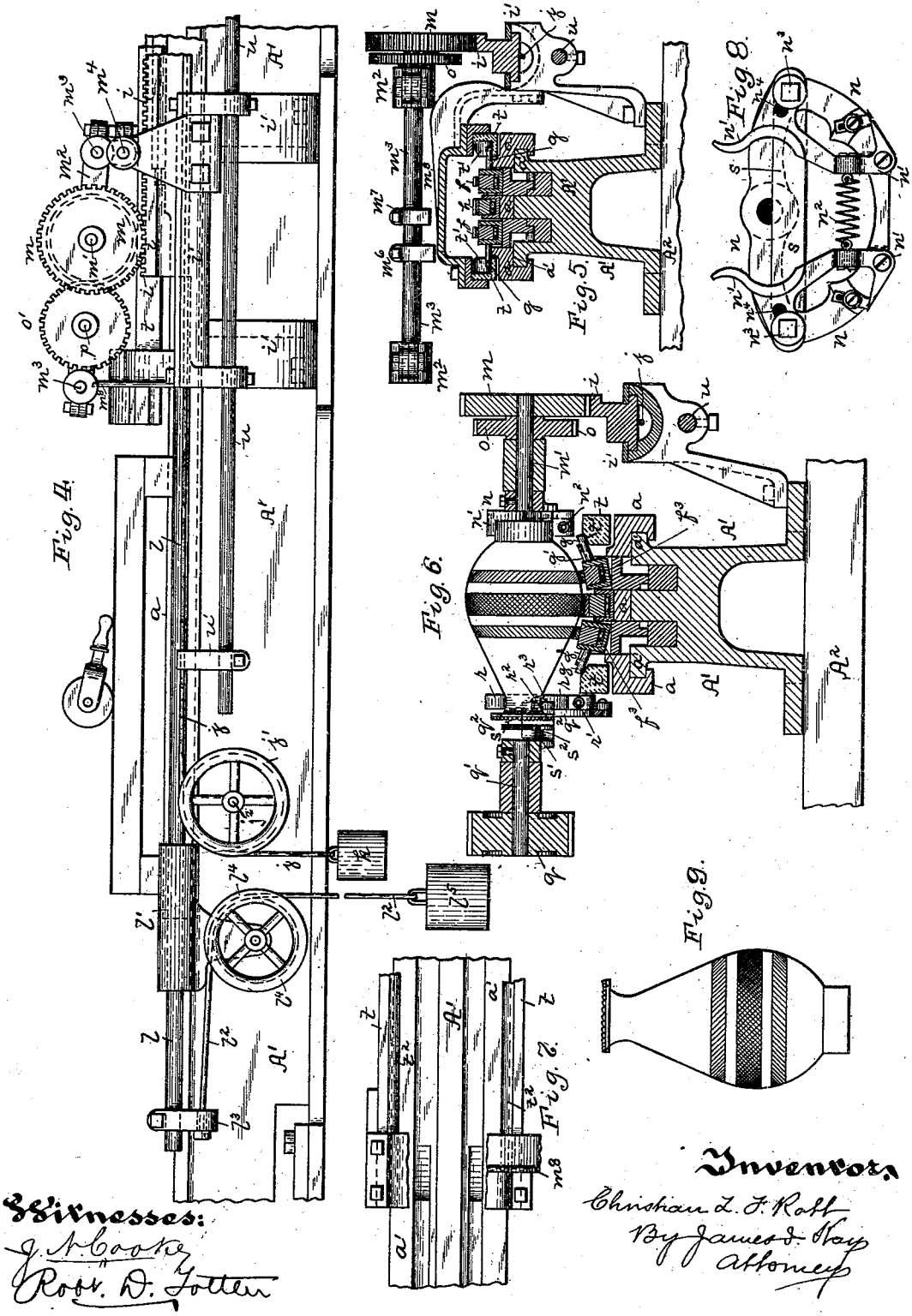

Fig. 4.

Fig. 5.

Fig. 8.

Fig. 6.

Fig. 2.

Fig. 9.

Witnesses:
J. McCooke
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(No Model.) 4 Sheets—Sheet 3.

C. Z. F. ROTT.

MACHINE FOR PRINTING GLASSWARE.

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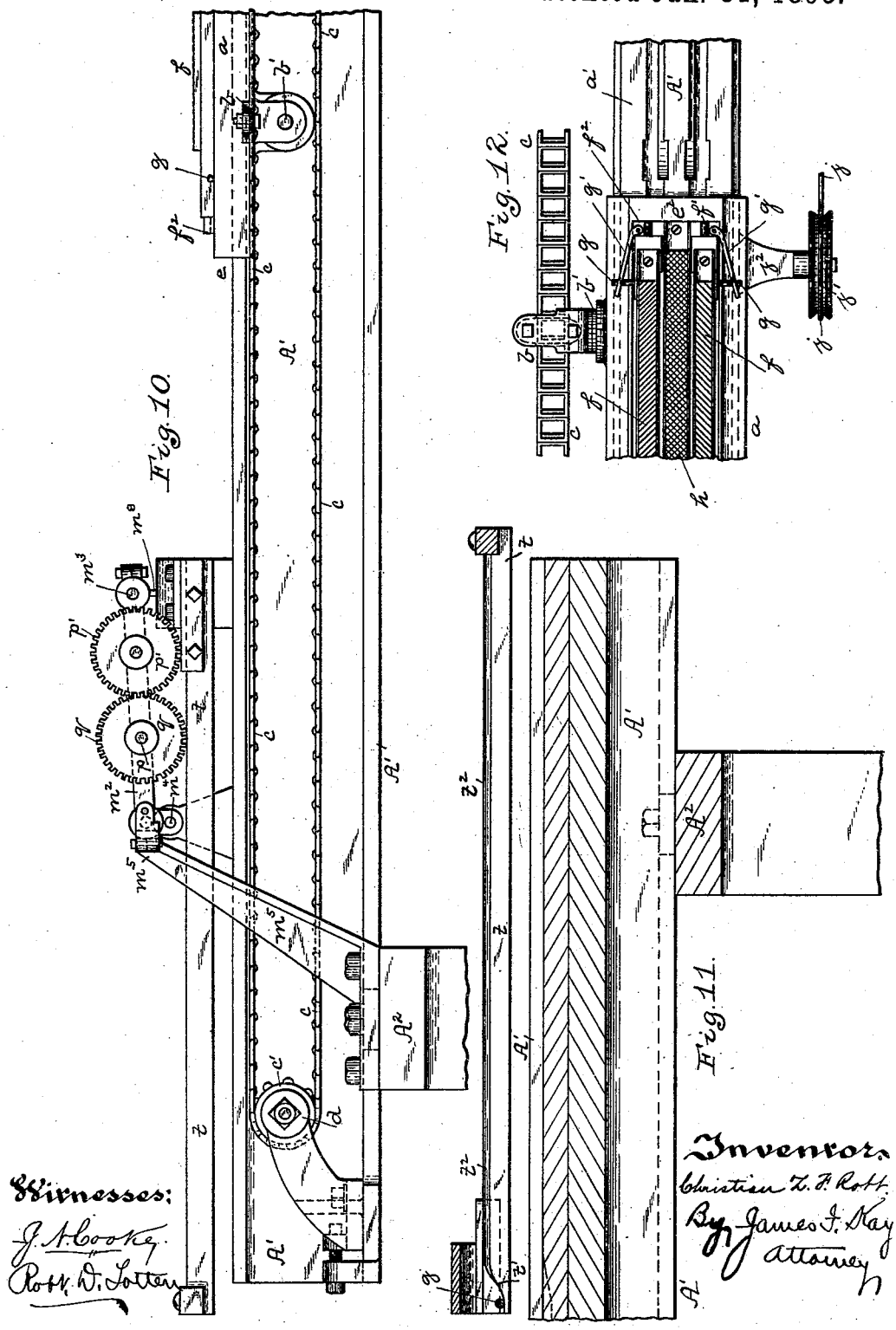

Fig. 10.

Fig. 12.

Fig. 11.

Witnesses:
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(No Model.) 4 Sheets—Sheet 4.

C. Z. F. ROTT.

MACHINE FOR PRINTING GLASSWARE.

No. 491,025. Patented Jan. 31, 1893.

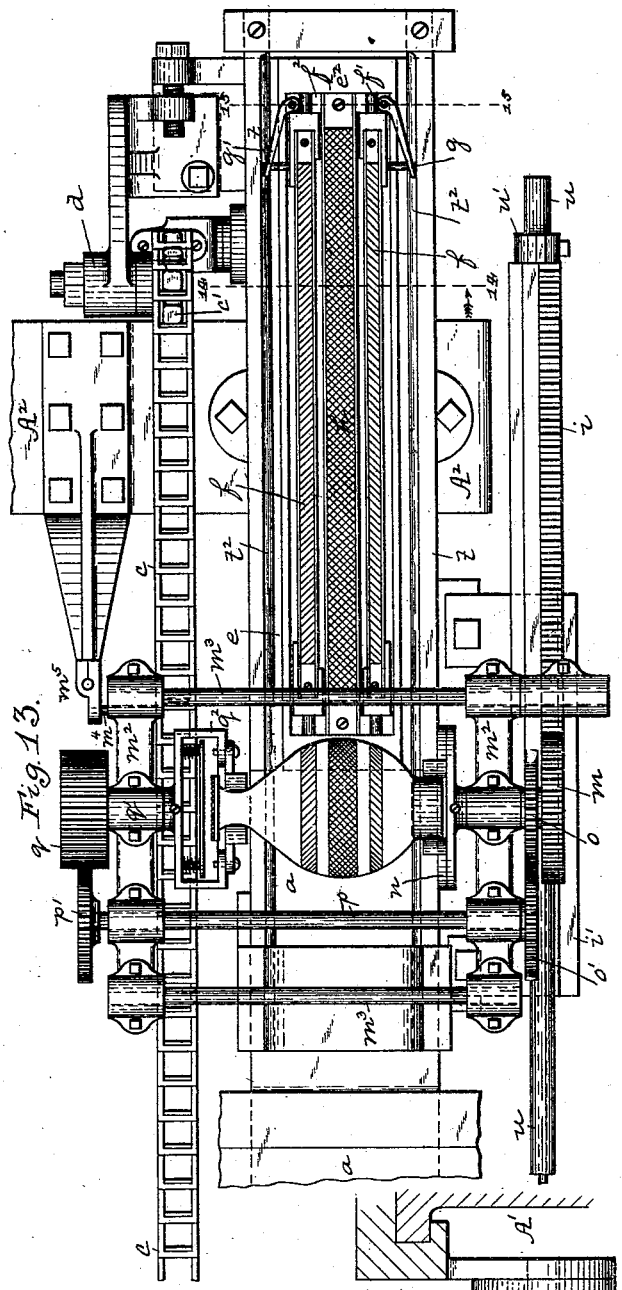

Fig. 13.

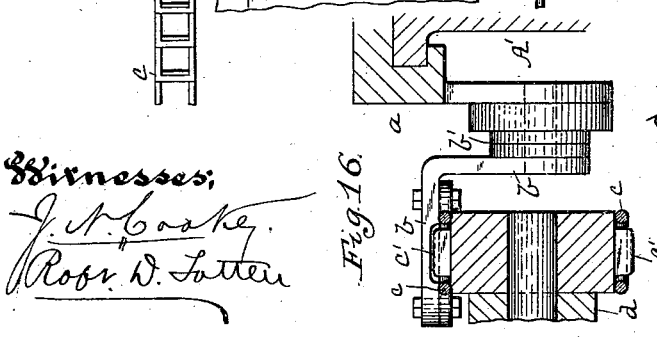

Fig. 16.

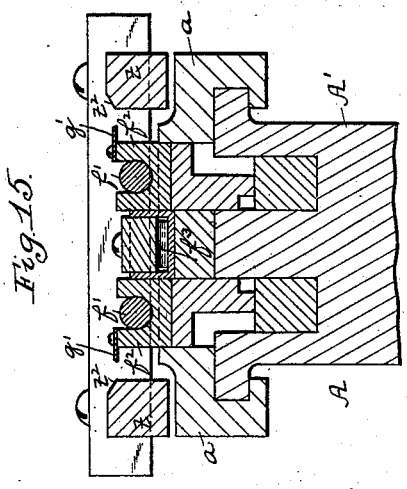

Fig. 15.

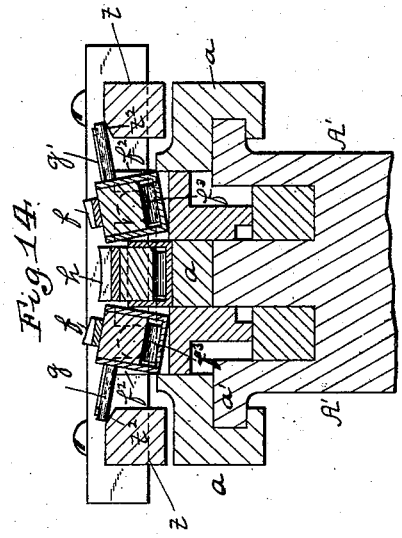

Fig. 14.

Witnesses:
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Christian Z. F. Rott.
By James L. Kay.
Attorney.

UNITED STATES PATENT OFFICE.

CHRISTIAN Z. F. ROTT, OF PITTSBURG, PENNSYLVANIA.

MACHINE FOR PRINTING GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 491,025, dated January 31, 1893.

Application filed May 23, 1891. Serial No. 393,865. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN Z. F. ROTT, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Machines for Printing on Glassware; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for decorating lamp chimneys and like articles of glass-ware, its object being to provide a form of apparatus by which designs or ornamentations may be imparted to the surface of such articles of glass-ware in rapid succession, to be subsequently baked into the glass to retain indelibly the design imparted thereto.

To these ends my invention comprises, generally stated, a traveling carriage having a type carrier secured thereto, type so mounted in the type carrier as to lay with an even horizontal surface for inking, and conform to the bulbous, or other shaped body of the chimney or other article during printing, and mechanism for rotating the chimney at such speed that its surface will move with the type block, so that the design may be printed around the cylindrical body.

My invention further comprises certain improvements in the arrangement and construction of the several parts embodied in the operation of such a form of apparatus as above generally stated, all of which will be more fully hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which

Figure 1 is a plan view of the apparatus; Fig. 2 a side view; Fig. 3 is a plan view showing the carriage advanced to its extreme forward position and about to retreat; Fig. 4 is an enlarged side view partly broken away, with the carriage in its advanced position; Fig. 5 is a cross-section on line (5—5); Fig. 1; Fig. 6 is a cross-section line (6—6) Fig. 1, showing the chimney in full lines during the printing operation; Fig. 7 is an enlarged view of device for conforming the type blocks to shape of chimney; Fig. 8 is a face view showing the chimney holders removed; Fig. 9 represents a finished chimney; Fig. 10 is an enlarged side view partly broken away, showing the opposite side to that shown in Fig. 4; Fig. 11 is an enlarged longitudinal section of the longitudinal beams forming the frame and showing the beveled edges of the guide-bars by which the type blocks are canted; Fig. 12 is an enlarged top view, partly broken away, of the frame and the type carrier. Fig. 13 is an enlarged plan view of the forward end of my improved printing machine after the type-carrier has advanced to the front end of the frame and is about to recede; Fig. 14 is a cross section on the line 14—14, Fig. 13, looking in the direction of the arrow; Fig. 15 is a cross section on the line 15—15, Fig. 13, showing the manner in which the type blocks are journaled in the type-carrier at the forward end thereof; Fig. 16 is an enlarged view of the sprocket wheel and chain in cross section, together with the crank arm for reversing the direction of the movement of the carriage.

Like letters indicate like parts.

The frame which supports the apparatus consists of the standards A, the longitudinal beams A′ and the cross-beams A^2. The sliding carriage a travels to and fro in the guideways a' formed in the longitudinal beams A′, and to provide for this advancement and withdrawal of said carriage a in its guides, a crank arm b is journaled at one end on the bearing b' secured to the carriage, the other end of said crank arm being secured to the driving chain c by bolts or other suitable fastening devices. The driving chain c engages with the sprocket wheels c' c^2, which are on the same horizontal plane as the bearing b', the front wheel c' being secured to the journal d at the forward end of the frame, and the rear sprocket wheel c^2 secured to the power shaft d'. By such a construction the carriage is drawn forward by the chain and when the crank arm b reaches the sprocket wheel c' or c^2 it swings on its bearing passing around the wheel, and passing above or below the wheel, and then draws the carriage in the opposite direction, the table remaining stationary at one or the other end of its stroke, when the crank arm is passing around the sprocket wheel.

Mounted on the carriage a and adapted to travel back and forth therewith is the type-carrier e. The type-carrier e is constructed in accordance with the design or ornamentation it carries, and the size and shape of the article upon which it operates to produce the design. In the drawings, I have illustrated a type-carrier carrying a design for the ornamentation of lamp chimneys or such like bulbous bodies, the design itself consisting of three bands encircling the chimney, as shown in Fig. 9. The type-carrier e is composed of the side bars e' and the end bars e^2.

It is obvious that to impart the design to the bulbous or convex portion of the lamp chimney, the types embodying the design must conform with the contour of that portion of the chimney to be ornamented. If, however, the type blocks be permanently secured within the type-carrier with their faces in conformity with the surface of the chimney to be ornamented, it will be a matter of much inconvenience to apply the substance to the type blocks which imparts the design to the glass. To provide for this inconvenience, the type blocks are so adjusted within the type carrier that when in position for applying the substance to them to impart the design, the faces of said type blocks present an even face, but when brought into contact with the chimney they are made to conform thereto in the manner hereinafter set forth. For this purpose the outer type-blocks f are provided with journals f' at the ends thereof bearing in the bearings f^2 in the end bars e^2 of the type-carrier. At the forward ends of the type-blocks f are the pins g held normally horizontal by the spring arms g', said spring arms g' being attached to the bearings f^2 of the type-carrier e, but when the pins g engage with certain guide bars upon the advance of the type-carrier e, as will more fully appear, said pins are raised which act to cant the type-blocks and bring them into conformity with the chimney. Beneath the type blocks f as well as the central type block h are the springs f^3 which act to cushion said type blocks f and h during the printing operation. The central type block h remains stationary, being permanently secured at both ends to the cross-bars e^2.

Just in advance of the type-carrier e and slightly to one side thereof is the rack i, said rack being adapted to slide to and fro in the guides i' formed in the frame of the apparatus. A cord or chain j is secured to the rear end of the rack i as at i^2 and passes thence over the pulley j' secured to the stud j^2 of the frame. A weight k is attached to the end of the cord or chain j.

To provide for the advancement of the rack i in its guides i', a rod l is carried by the carriage a, said rod being supported by a sleeve l' see Fig. 4, projecting out from the carriage a in order to bring the rod l into alignment with the rear end of the rack i (said sleeve being free to move to and fro on said rod in the manner hereinafter described). A cord or chain l^2 is secured to the rear end of the rod l to the lug l^3, and passes forward over the pulley l^4 secured to a depending bracket on the traveling carriage. A weight l^5 is attached to the end of the cord or chain l^2 and as will more fully appear in the operation of the apparatus, the weight l^5 must be heavier than the weight k attached to the cord j.

The rack i engages with the pinion m secured to the shaft m' mounted in bearings in the arms m^2, said arms being connected by the cross arms m^3. This chimney supporting frame formed by the arms m^2 and cross-arms m^3 is hinged at m^4 to uprights m^5 on the main frame A. This construction permits of the swinging of the supporting frame toward the front end of the machine. The height of this supporting frame may be adjusted by means of the depending lugs m^6 m^7 on the rear cross-arm m^3. The lugs m^6 m^7 are adapted to be moved along the said cross-arm and the lug m^6 is longer than the lug m^7. In traveling along the cross-arm m^3 the lugs m^6 m^7 come in contact with the inclined top of the rib m^8, whereby as said lugs travel up said inclined rib m^8, the supporting frame is raised to correspond to the size of the chimney to be printed on. Secured to the inner end of the shaft m' is the bracket n which supports the base of the chimney, said bracket n having the curved arms n' pivoted thereto adapted to embrace the base of the chimney and hold it firmly in its grasp, and for this purpose the spring n^2 is interposed between the lower ends of said arms n' to throw said arms normally around the base of the chimney. To allow for the opening of said arms to remove a chimney or insert one therein, pins n^3 engage with slots n^4 on said arms n', the pins n^3 being secured to the bracket n and traveling in the said slots n^4, upon the opening of the arms n'. On the shaft m' is another pinion o which meshes with a pinion o' on the shaft p, said shaft extending over the frame of the apparatus to the opposite side and supported in suitable bearings. On the inner end of the shaft p is the pinion p' which meshes with the gear wheel q secured to the journal q'. A bracket q^2 similar to the bracket n on the opposite side is secured to the inner end of the journal q', and said bracket is likewise furnished with curved arms r adapted to embrace the neck of the chimney, after the manner of the curved arms n', being provided with the spring r' and the slots r^2 engaging with the pins r^3 on the bracket q^2. The bracket q^2 is further provided with a head piece s to prevent any longitudinal movement on the part of the chimney when held by the arms of the brackets. This head piece s is secured at its ends to the pins s' on the bracket q^2, the coiled springs s^2 being interposed between said head piece and the bracket to force said head piece normally into contact with the head or top of the chimney, to aid in the support of said chimney. If de-

sired the head piece s can be used in the base holder n as illustrated in Fig. 8.

As hereinbefore set forth the type blocks f are so adjusted within the type carrier as to be capable of being canted in their bearings f^2 in order to bring the face of said type blocks into conformity with the bulbous surface to be decorated. To provide for this canting of the type-blocks f guide bars t are secured to the top of the frame beginning at points just to the rear of the chimney supports. The guide bars t have sufficient space between them to allow for the passage of the type-carrier e. The rear ends of said guide bars t are provided with the inclined faces t' while the inner edges of said bars are beveled as at t^2, so that on the entrance of the type-carrier e within the said guide bars, the pins g of the type blocks f will travel up the inclined faces t' to gradually cant the said type-blocks, and then along the beveled edges t^2, thus canting said type blocks as long as the pins g travel along the beveled edges t^2.

A bar or rod u is secured to the frame below the rack i, said rod having the stops or lugs u' thereon with which the ends of the rack come in contact, when it moves back and forth thereby regulating the distance said rack is to travel in its guides.

In the operation of my improved apparatus the several parts are first brought to their respective positions with relation to each other, as shown in Fig. 1. The substance which imparts the ornamentation to the chimney is applied by a suitable roller to the faces of the type-blocks f and h and a chimney is inserted in the brackets n and q^2, the base of said chimney embraced by the arms n' and the neck thereof by the arms r. Power is then exerted to drive the shaft d', and through it the driving chain c. Since the driving chain c is connected to the carriage a by the crank arm b, as the chain c advances toward the front end of the frame the carriage a moving in its guides a' pursues the same direction. When the carriage a has advanced far enough to bring the type-carrier e to the guide bars t, upon further advancement the pins g will travel up the inclined faces of said bars, and will pass on to the beveled edges t^2 to cant the type-blocks to a certain pre-arranged angle to bring their faces into conformity with the surface of the chimney. Meanwhile, coincident with the advance of the carriage, a and the type-carrier e, the rod l has also been advancing, and just as the type-blocks are about to pass under the chimney with their faces in contact and conforming therewith, the end of the rod l collides with the rear end of the rack i. Upon the further advance of the carriage a the type-carrier e with its type-blocks f and h in contact with the chimney passes under said chimney, while at the same time the chimney is rotated in its brackets. For as the rod l advances the rack i the pinion m rotates the shaft m' and the brackets n holding the base of the chimney, while through the pinions $o\,o'$ the shaft p and pinion p' and gear wheel q, a like rotary movement is imparted to the bracket q^2 supporting the neck of the chimney. This simultaneous movement of the type-carrier e, with its type-blocks in contact with the chimney, and the rotation of the chimney, will obviously produce the effect shown in Fig. 9, a design consisting of three clearly defined bands completely encircling the chimney. The rack i is made of a length sufficient to impart through the mechanism described one complete revolution to the brackets n and q^2 which support the chimney. When the type-carrier e has passed beyond the chimney having imparted the design to its entire circumference, as shown in Fig. 1, the rack i has reached its extreme forward movement and abuts against the forward stop u' on the rod u, while the weight k which has been gradually elevated by the advance of the rack i assumes the position shown in Fig. 4. The carriage a continues to advance a short distance after the stoppage of the rack i to permit of time to withdraw the chimney before the carriage begins its retreat. It is evident that with the rod l in contact with the end of the rack i, the said rod cannot accompany the carriage in this further movement. The weight l^5 acts to hold the lug l^3 on the rod l in contact with the adjacent end of the sleeve l', and said weight l^5 being heavier than the weight k, the result is that as the rod l advances and meets the rack i said rod drives forward the rack i and raises the weight k. When the rack i has reached the extreme limit of its forward movement, the rod l is also brought to a standstill, but as the carriage still advances a short distance the sleeve l' will consequently travel along the rod l for a short distance, the cord l^3 secured to said rod passing up over the pulley l^4 moving with the carriage, thus elevating slightly the weight l^5. At this stage of the operation the crank arm b passes over the front sprocket wheel c^2 when that portion of the driving chain to which it is secured and which hitherto has been advancing, returns to the rear of the apparatus. Since said crank arm b is also secured to the carriage a the said carriage together with the type-carrier e and rod l return to resume their original positions. Upon the first backward movement of the carriage a the weight l^5 will be lowered and the arm l resume its former position with respect to the sleeve l'. After this the rod l is free to travel back with the carriage a, while at the same time the rack i is free to retreat in its guides, the weight k acting to produce the necessary power to accomplish its retreat. The weight l^5 being heavier than the weight k prevents the retreating of the rack i until said weight l^5 is lowered, when the weight k can then descend and draw with it the rack i. In this manner all the parts are brought back to their original positions until the crank arm b has ascended the sprocket wheel c' and again carried forward

the carriage *a*, when, a chimney having been inserted in the brackets, the operation just described is repeated with the same result.

Any suitable substance may be employed for printing on the chimneys, either an ink or paste containing the vitrifiable color, so that the same is applied directly to the chimney, a sticky substance over which the powdered color or etching substance may be dusted, or an etching substance in paste form. Such printing substances may either be applied by means of inking rollers mounted on the machine and inked in the ordinary way, or by means of a hand-inking wheel, the latter being preferable where the sticky substance is applied to the chimney, as one application thereof will be sufficient for inking several chimneys, and the operator can easily attend to the inking.

What I claim as my invention and desire to secure by Letters Patent, is;

1. In machines for printing on lamp chimneys and like cylindrical articles, the combination with the article holder, turning in suitable bearings, of a longitudinally movable type-carrier having type-blocks journaled thereon and adapted to be canted to conform to the chimney or like article to be printed upon, substantially as and for the purposes set forth.

2. In machines for printing on lamp chimneys, and other like cylindrical articles, the combination with the article holder turning in suitable bearings, of a holder longitudinally movable type-carrier having type-blocks journaled thereon, and suitable guides for canting said type-blocks and so causing them to conform to the chimney or other article to be printed upon, substantially as and for the purposes set forth.

3. In machines for printing on lamp chimneys and like cylindrical articles, the combination with a chimney holder turning in suitable bearings, of a longitudinally movable type-carrier having type-blocks journaled thereon and provided with pins or fingers at the forward ends, and a suitable guideway with which said fingers engage for canting said type-blocks and so causing them to conform to the article to be printed upon, substantially as and for the purposes set forth.

4. In machines for printing on lamp chimneys and like cylindrical articles, the combination with a chimney holder turning in suitable bearings, of a longitudinally movable type-carrier having type-blocks journaled thereon and provided with pins or fingers at the forward ends, a suitable guideway with which said fingers engage for canting said type-blocks, and spring arms for retaining said type-blocks in their normal position, substantially as and for the purposes set forth.

5. In machines for printing on lamp chimneys, and like cylindrical articles, the combination with the chimney holder turning in suitable bearings, of a longitudinally movable type-carrier, type-blocks mounted thereon and adapted to be canted to conform to the article to be printed upon and a stationary or non-cantable type-block on said carrier, substantially as and for the purposes set forth.

6. In machines for printing on lamp chimneys and like cylindrical articles, the combination with the frame of the article holder turning in suitable bearings thereon, a type-carrier traveling back and forth in said frame, type-blocks journaled thereon and adapted to be canted to conform to the chimney, and inclined guide bars secured to the frame in the front of said type-carrier to cant said type-blocks, substantially as and for the purposes set forth.

7. In machines for printing on lamp chimneys and like cylindrical articles, the combination of the frame, the article holder mounted thereon in suitable bearings, gearing for turning said chimney holder, and a type-carrier reciprocating in said frame and operating a rack engaging with the gearing for turning the article holder, substantially as and for the purposes set forth.

8. In machines for printing on lamp chimneys and like cylindrical articles, in combination with the article holder, of a longitudinally movable type-carrier having a series of type-blocks thereon, said type-blocks normally having their faces horizontal and on the same plane with each other, but one or more of said type-blocks being mounted so as to be canted to conform to the article to be printed upon, substantially as and for the purposes set forth.

9. In machines for printing on cylindrical and like glassware, the combination with the frame, of an article holder mounted thereon, a sliding rack mounted on the frame and operating a pinion adapted to rotate said holder and a reciprocating type-carrier traveling longitudinally on said frame and having an arm engaging said rack so as to rotate the article to be decorated, substantially as and for the purposes set forth.

10. In machines for printing on cylindrical and like glassware, the combination with the frame, of an article holder mounted thereon, a sliding rack mounted on the frame and operating said holder and a reciprocating type-carrier traveling longitudinally on said frame and having an arm engaging said rack so as to rotate the article to be decorated, said arm sliding in a suitable bearing in the type-carrier and having a weight connected thereto to hold it up to its work, substantially as and for the purposes set forth.

11. In machines for printing on cylindrical and like glassware, the combination with the frame, of an article holder mounted thereon, a sliding rack mounted on the frame and operating said holder and a reciprocating type-carrier traveling longitudinally in said frame and having an arm engaging said rack so as to rotate the article to be decorated, said sliding rack having a weight connected to the

rear thereof to withdraw it upon the retreat of the type-carrier, substantially as and for the purposes set forth.

12. In machines for printing on chimneys and like cylindrical glass, the combination of the frame, of an article holder mounted thereon, a sliding rack mounted in said frame and acting to rotate said holder, a weight connected to said rack and acting to draw back the same, and a reciprocating type-carrier mounted on said frame and having an arm engaging said rack, said arm sliding in a suitable bearing in said type-carrier and having a weight connected to the same and adapted to force and hold it in its forward position, substantially as and for the purposes set forth.

13. In machines for printing on chimneys and like cylindrical glass, the combination with the frame of an article holder mounted thereon, a sliding rack mounted in said frame and acting to rotate said holder, a weight connected to said rack and acting to draw back the same, and a reciprocating type-carrier mounted on said frame and having an arm engaging said rack, said arm sliding in suitable bearings in said type-carrier and having a weight connected to the same and adapted to force and hold it in its forward position, and stops on said frame to regulate the forward and backward movement of said rack, substantially as and for the purposes set forth.

14. In machines for printing on chimneys and like cylindrical glass articles, the combination with the frame A, of the chimney supporting frame consisting of the arms m^2, cross-arms m^3 hinged to uprights m^4, the adjustable lugs m^6 m^7 on the rear cross-arm m^3, and the inclined rib m^8, substantially as and for the purposes set forth.

In testimony whereof I, the said CHRISTIAN Z. F. ROTT, have hereunto set my hand.

CHRISTIAN Z. F. ROTT.

Witnesses:
ROBT. D. TOTTEN,
JAMES I. KAY.